

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A method for providing continuous data protection, the method comprising the steps of:

writing data to a primary volume;

duplicating the writes made to [[a]] the primary volume to a secondary volume in a sequential fashion, wherein the secondary volume contains a chronological ordering of all writes made to the primary volume; and

identifying a APIT an any point in time (APIT) window wherein all writes to the secondary volume are maintained so that within the identified time APIT window, the primary volume may be restored to any previous point in-time within the APIT window.

2. (Currently amended) The method of claim 1 further including the step of mapping the writes between the primary volume and secondary ~~volume~~ volume.

3. (Currently amended) The method of claim 1 further including the ~~steps~~ step of retaining particular points in time beyond the APIT window.

4. (Currently amended) The method of claim 3 wherein a point-in-time map is created by creating a full mapping between the primary volume and the

secondary ~~volumes~~ volume for a point in time that is retained beyond the APIT window, the full mapping using a data structure.

5. (Currently amended) The method of claim 4 wherein the full mapping is created by merging ~~mapping~~ data structures ranging in time from an initial time ~~zero to the~~ a time ~~the~~ when a snapshot was taken.

6. (Currently amended) The method of claim 4 wherein the full mapping is created by merging ~~mapping~~ data structures ranging in time from ~~the a~~ time a point-in-time map created prior to ~~the a~~ snapshot was taken to ~~the a~~ time when the snapshot was taken.

7. (Currently amended) The method of claim 1 wherein data on the secondary volume that is outside of the identified ~~time~~ APIT window is discarded.

8. (Currently amended) The method of claim 1 wherein data on the secondary volume that is outside of the identified ~~time~~ APIT window is phased out according to a retention policy.

9. (Currently amended) The method of claim 4 further comprising the step of periodically creating point-in-time maps to reduce ~~the amount~~ a number of ~~mapping~~ data structures that are needed when performing a restore.

10. (Currently amended) A method for operating a data protection system for a protected computer system, the method comprising the steps of:
tracking writes made to a primary volume;

duplicating the writes to the primary volume in a sequential fashion on a secondary volume, wherein the secondary volume contains a chronological ordering of all writes made to the primary volume;

organizing ~~the~~ a mapping of the writes between the primary volume and the secondary ~~volumes~~ volume into ~~delta-maps~~ data structures, wherein the ~~delta-maps~~ are structured to data structures enable the primary volume to be ~~rewound~~ restored to any point in time; and

identifying ~~[[a]]~~ an any point in time window wherein the data structures are maintained so that within the identified time window, the primary volume may be restored ~~[[at]]~~ to any point in time within the time window.

11. (Currently amended) The method of claim 10 wherein a snapshot is taken at a particular point in time within the identified time window and a full mapping of the primary volume and the secondary ~~volumes~~ volume for the particular point time is created.

12. (Currently amended) The method of claim 11 wherein the full mapping is created by merging ~~delta-maps~~ data structures ranging in time from an initial time ~~zero~~ to ~~the~~ a time when the snapshot was taken.

13. (Currently amended) The method of claim 11 wherein the full mapping is created by merging ~~delta-maps~~ data structures ranging in time from ~~the~~ a time when a point-in-time map created prior to the snapshot was taken to the time the snapshot was taken.

14. (Currently amended) A system for providing continuous data protection, the system comprising:

a host computer;

a primary volume for storing data written by the host computer;

a secondary volume wherein writes made to the primary volume are sequentially duplicated onto the secondary volume, the secondary volume containing a chronological ordering of all writes made to the primary volume; and

a data protection system configured to manage the duplication of writes to the secondary volume and to map data between the primary volume and the secondary volumes volume using delta-maps data structures, wherein ~~a time window is established wherein~~ the data structures are maintained so that within ~~the an~~ established time window, the primary volume may be restored to any point ~~in time~~ within the time window.

15. (Original) The system of claim 14 wherein the data protection system is configured to create a point-in-time map for a point-in-time at which the primary volume needs to be restored.

16. (Currently amended) The system of claim 15 wherein the point-in-time map is created by creating a full mapping between the primary volume and the secondary volumes volume.

17. (Currently amended) The system of claim 16 wherein the full mapping is created by merging ~~mapping~~ data structures ranging in time from an initial time zero to ~~the a time the~~ when a snapshot was taken.

18. (Currently amended) The system of claim [[16]] 17 wherein the full mapping is created by merging ~~mapping~~ data structures ranging in time from ~~the a~~ time when a point-in-time map created prior to the snapshot was taken to the time the snapshot was taken.

19. (Canceled)

20. (New) A computer-readable storage medium containing a set of instructions for a general purpose computer, the set of instructions comprising:

a tracking code segment for tracking writes made to a primary volume;

a duplicating code segment for duplicating the writes to the primary volume in a sequential fashion on a secondary volume, wherein the secondary volume contains a chronological ordering of all writes made to the primary volume;

an organizing code segment for organizing a mapping of the writes between the primary volume and the secondary volume into data structures, wherein the data structures enable the primary volume to be ~~rewound~~ restored to any point in time; and

an identifying code segment for identifying an any point in time window wherein the data structures are maintained so that within the identified time window, the primary volume may be restored to any point within the time window.

21. (New) A method for enabling data recovery from a primary volume in a continuous data protection system, comprising the steps of:

creating an initial copy of the primary volume;

after the initial copy is made, duplicating each write to the primary volume to a secondary volume, wherein the secondary volume contains a chronological ordering of all writes made to the primary volume; and

creating a snapshot of the primary volume, the snapshot being a point in time to which the primary volume can be restored.

22. (New) The method according to claim 21, wherein the secondary volume is served by a write log, the write log receiving each of the duplicated writes to the secondary volume, the write log being written to the secondary volume when full.

23. (New) The method according to claim 22, wherein the triggering step includes inserting a marker into the write log, the marker indicating a time at which the snapshot is taken.

24. (New) The method according to claim 22, further comprising the step of:

creating a block-ordered data structure to track the writes made to the secondary volume, the data structure being derived from the write log and containing the writes made to the primary volume between two points in time.

25. (New) The method according to claim 24, further comprising the step of:

optimizing the data structure by merging data structures from a time corresponding to a snapshot to a current time.

26. (New) A method for providing continuous data protection, comprising the steps of:

writing data to a primary volume;

duplicating the writes made to the primary volume to a secondary volume in a sequential fashion, wherein the secondary volume contains a time-based ordering of all writes made to the primary volume; and

identifying an any point in time (APIT) window wherein all writes to the secondary volume are maintained so that within the identified APIT window, the primary volume may be restored to any previous point within the APIT window.

27. (New) The method of claim 26, further comprising the step of mapping the writes between the primary volume and secondary volume.

28. (New) The method of claim 26, further comprising the step of retaining particular points in time beyond the APIT window.

29. (New) The method of claim 28, wherein a point in time map is created by creating a full mapping between the primary volume and the secondary volume for a point in time that is retained beyond the APIT window, the full mapping using a data structure.

30. (New) The method of claim 29, wherein the full mapping is created by merging data structures ranging in time from an initial time to a time when a snapshot was taken.

31. (New) The method of claim 29, wherein the full mapping is created by merging data structures ranging in time from a time a point in time map created prior to a snapshot was taken to a time when the snapshot was taken.

32. (New) The method of claim 29, further comprising the step of periodically creating point in time maps to reduce a number of data structures that are needed when performing a restore.

33. (New) The method of claim 26, wherein data on the secondary volume that is outside of the identified APIT window is discarded.

34. (New) The method of claim 26, wherein data on the secondary volume that is outside of the identified APIT window is phased out according to a retention policy.